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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,388	01/13/2004	Tatsuo Izawa	32307-200180	9974
26694	7590	07/22/2004	EXAMINER	
VENABLE, BAETJER, HOWARD AND CIVILETTI, LLP P.O. BOX 34385 WASHINGTON, DC 20043-9998			CONNELLY CUSHWA, MICHELLE R	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/755,388	IZAWA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Michelle R. Connelly-Cushwa	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8 and 9 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/13/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0104</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Priority***

Applicant is requested to provide a copy of PCT/JP02/07128, from which the present application is a continuation.

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

The prior art document submitted by applicant in the Information Disclosure Statement filed on January 13, 2004 has NOT been considered because a copy of the document (WO 00/25160 A1) has not been provided (note the attached copy of form PTO-1449).

### ***Drawings***

Six (6) sheets of formal drawings were filed on January 13, 2004 and have been accepted by the Examiner.

### ***Specification***

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Regarding claim 3; the claim recites the limitation "said area for deep grooves is deeper than said switching grooves" in lines 2-3 of claim 3. This limitation is unclear because claim 2, from which claim 3 depends, recites the limitation "an area of deep grooves which is approximately as deep as said switching grooves" in lines 1-3 of claim 2, and it is not clear how the area of deep grooves can have the same depth as that of the switching grooves and be deeper than the switching grooves.

Claim 3 has not been further treated with respect to prior art.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 2 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Edwards et al. (WO 01/65292 A1).**

Regarding claim 1; Figures 1 and 2 of Edwards et al. disclose a matrix switch (1) of an optical waveguide type comprising:

- a first set of m mutually parallel optical waveguides (11) arranged on a substrate (10);

- a second set of  $n$  mutually parallel optical waveguides (12) intersecting the first set of optical waveguides (11) and arranged on the substrate (10), wherein  $m$  and  $n$  are integers;
- switching grooves (trenches, 15) for switching light between light paths each arranged at each of the intersections of the first and second set of optical waveguides; and
- a switching part (mirror, 22) for selecting either one of a light path extending from an input port of the first set of optical waveguides (11) to an output port of the first set of optical waveguides (11) and a light path extending from an input port of the first set of optical waveguides (11) to an output port of the second set of optical waveguides (12), the switching part being an insertion plate (mirror, 22) having a reflective surface and arranged for insertion into the switching groove;
- wherein each of the switching grooves is arranged on an imaginary straight line connecting intersections of the first and second sets of optical waveguides and filled with a liquid (30) having a refractive index matching with that of the optical waveguides (see the abstract and page 5, line 21, through page 8, line 5).

Regarding claim 2; the switch (1) comprises an area of deep grooves that is as deep as the switching grooves and arranged in an area other than the optical waveguides on the substrate (see Figure 1, in which the trenches, 15, are connected

along straight lines with areas of deep grooves in areas on the substrate not including waveguides).

Regarding claim 4; the width of the switching grooves (trenches, 15) is 10 micrometers or less (see page 7, line 19).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards et al. (WO 01/65292 A1) in view of Lelic (US 6,493,480 B1).**

Regarding claims 5 and 7; Edwards et al. discloses all of the limitations of claims 5 and 7 as applied above, except for the switch comprising first, second and third sets of dummy grooves arranged at any of the input ports of the first set of waveguides, of the output ports of the first set of waveguides, and of the output ports of the second set of waveguides, respectively; the dummy trenches being filled with refractive index matching liquid and having a width of 10 micrometers or less.

In column 9, lines 1-12, Lelic teaches that in the case of matrix switches employing intersecting waveguides to define light paths with trenches (grooves) formed at the intersections of the waveguides, the trenches (grooves) have an impact on the loss experienced by light traveling therethrough. Lelic further teaches that dummy trenches (grooves) designed to provide the same losses as the switching trenches for

each path through the switch may be used to provide loss equalization by forming the dummy trenches within the increased length of the waveguides not at the intersections (i.e. forming the dummy trenches at the inputs and outputs of the waveguides).

Therefore, one of ordinary skill in the art would have found it obvious to provide first, second and third sets of dummy trenches (grooves) arranged at any of the input ports of the first set of waveguides, of the output ports of the first set of waveguides, and of the output ports of the second set of waveguides, respectively, in the matrix switch disclosed by Edwards et al. to provide loss equalization as taught by Lelic.

All trenches/grooves arranged on the input and output waveguides are inherently formed on an imaginary straight line connecting the intersections of the first and second sets of optical waveguides.

Furthermore, one of ordinary skill in the art would have found it obvious to fill the dummy trenches (grooves) with the same refractive index matching liquid (30) disclosed by Edwards et al. and to form the dummy trenches (grooves) in the same dimensions (i.e. a width of 10 micrometers or less) as the trenches disclosed by Edwards et al. in order to provide dummy trenches substantially identical to the "switching" trenches (15) disclosed by Edwards et al. so that the dummy trenches and the "switching" trenches have substantially the same losses, as taught by Lelic.

#### ***Allowable Subject Matter***

Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 8 and 9 are allowed.

The following is an examiner's statement of reasons for indicating allowable subject matter: The prior art cited on attached form PTO-892 is the most relevant prior art known, however, the invention of claims 6, 8 and 9 distinguishes over the prior art of record for the following reasons.

Regarding claim 6; the claim is allowable over the prior art of record because none of the references either alone or in combination disclose or render obvious a matrix switch as defined in claim 6, wherein the dummy grooves are arranged such that signal light incident into the input ports of the first set of optical waveguides passes  $m+n-1$  grooves before outputting from the output ports of the first or second sets of optical waveguides in combination with the limitations of the base and intervening claims.

Regarding claims 8 and 9; the claims are allowable over the prior art of record because none of the references either alone or in combination disclose or render obvious a method for manufacturing a matrix switch as defined in claim 8, comprising arranging an area for deep grooves with depth deeper than the depth rotationally cut by a cutting edge outside the optical waveguides on the substrate; and forming each of the switching grooves on the imaginary straight line by rotationally cutting an upper surface of the substrate, on which the first and second sets of optical waveguide have been formed, by said cutting edge in combination with the other limitations of claim 8. Claim 9 depends from claim 8.



Hence, there is no reason or motivation for one of ordinary skill in the art to use the prior art of record to make the invention of claims 6, 8 and 9.

### ***Conclusion***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Fouquet (US 6,195,478 B1); Beguin et al. (6,587,626 B2); and Sasakura et al. (JP 04-255804 A) each disclose optical matrix switches having trenches/grooves formed at the intersections of optical waveguides on a substrate, the trenches being filled with index matching fluid, and an insertion plate/mirror being provided to optionally be inserted into the trenches to switch an optical signal between waveguides.

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.

*Michelle R. Connelly-Cushwa*

Michelle R. Connelly-Cushwa  
Patent Examiner  
July 20, 2004